



US006428650B1

(12) **United States Patent**  
**Chung**

(10) **Patent No.:** **US 6,428,650 B1**  
(45) **Date of Patent:** **Aug. 6, 2002**

(54) **COVER FOR AN OPTICAL DEVICE AND  
METHOD FOR MAKING SAME**

**FOREIGN PATENT DOCUMENTS**

WO PCT/US99/13738 10/1999

(75) Inventor: **Kevin Kwong-Tai Chung**, Princeton  
Township, NJ (US)

**OTHER PUBLICATIONS**

(73) Assignee: **Amerasia International Technology,  
Inc.**, Princeton Junction, NJ (US)

P. scharf, T. Coleman and K. Avellar, "Flip Component  
Technology", IEEE Electronic Component Conference  
(1967), pp. 269-274.

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 2 days.

Gilleo, K: "Direct Chip Interconnect Using Polymer Bond-  
ing", IEEE 39th Electronic Component Conference, May,  
1989, pp. 37-44.

(21) Appl. No.: **09/633,791**

R. Lachance, H. Lavoie, A. Montanari, "Corrosion/Migra-  
tion Study of Flip Chip Underfill and Ceramic Overcoating",  
IEEE Electronic Components and Technology Conference  
(1997), pp. 885-889.

(22) Filed: **Aug. 7, 2000**

T. Y. Wu, Y. Tsukada, W. T. Chen, "Materials and Mechanics  
Issues in Flip-Chip Organic Packaging", IEEE Electronic  
Components and Technology Conference, (1996) pp.  
524-534.

**Related U.S. Application Data**

B. Rosner, J. Liu, Z. Lai, "Flip Chip Bonding Using Isoto-  
pically Conductive Adhesives", Electronic Components and  
Technology Conference, (1996) pp. 578-581.

(63) Continuation-in-part of application No. 09/232,936, filed on  
Jan. 9, 1999, now Pat. No. 6,136,122.

(List continued on next page.)

(60) Provisional application No. 60/090,295, filed on Jun. 23,  
1998, provisional application No. 60/092,170, filed on Jul. 9,  
1998, and provisional application No. 60/198,705, filed on  
Apr. 20, 2000.

(51) **Int. Cl.**<sup>7</sup> ..... **B32B 31/18**; C09J 11/00;  
H01L 21/463; H01L 31/0232; H05K 5/06

(52) **U.S. Cl.** ..... **156/250**; 156/257; 156/277;  
156/295; 156/69; 438/113; 438/116; 438/118;  
438/144; 174/50.51; 174/52.3; 257/434;  
250/239

*Primary Examiner*—J. A. Lorengo

(74) *Attorney, Agent, or Firm*—Dann, Dorfman, Herrell  
and Skillman, P.C.

(58) **Field of Search** ..... 156/235, 240,  
156/241, 248, 250, 257, 265, 268, 277,  
280, 291, 295, 69; 432/113, 114, 116, 118,  
128; 174/50.51, 52.3; 257/81, 87, 433,  
434, 264; 250/208.1, 214 R, 239

(57) **ABSTRACT**

An optical device is enclosed within a package or module  
having an optically transmissive or transparent cover that is  
sealed with an adhesive preform that has been pre-applied  
onto the bonding areas of the cover. The adhesive preforms  
are formed of a wet adhesive deposited on a sheet of  
optically transmissive or transparent material as a preform in  
predetermined locations and are B-staged or dried to form  
dry solid adhesive preforms. The preforms may be contin-  
uous or have one or more small gaps therein. The sheet of  
optical material is diced or singulated to produce individual  
optical covers having an adhesive preform thereon.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,014,524 A 9/1935 Franz  
2,774,747 A 12/1956 Wolfson et al.  
3,401,126 A 9/1968 Miller et al.  
3,429,040 A 2/1969 Miller  
4,113,981 A 9/1978 Fujita et al.

(List continued on next page.)

**34 Claims, 5 Drawing Sheets**

